



### EL 351 Linear Integrated Circuits Laboratory Absolute Value Circuit?

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#### Equipment:

- Agilent 54622A Deep-Memory Oscilloscope
- Agilent E3631A Triple-Output DC power supply
- Agilent 33120A Function Generator
- Agilent 34401A Digital Multimeter

#### Introduction:

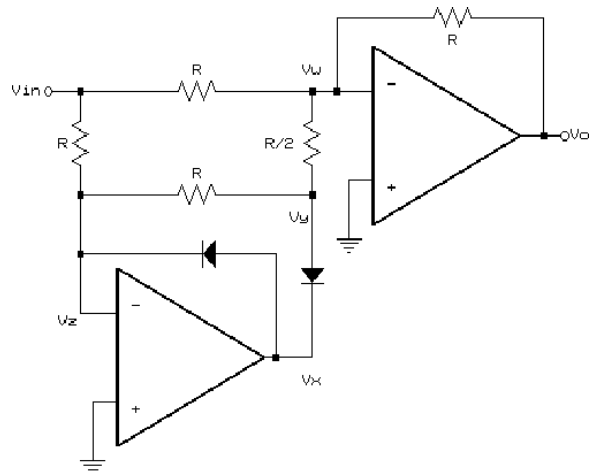
The circuit shown below is **thought to be** an absolute value circuit, sometimes called a precision full-wave rectifier. If it is, it should operate like a bridge rectifier circuit constructed with ideal diodes (the voltage across the diode, in forward conduction, equals 0 volts). The actual diodes used in the circuit are silicon, with a forward voltage around 0.6 V.

For this laboratory exercise you should:

- Study the circuit and determine how it works. There are two very fundamental concepts that should help in understanding how this circuit operates: the input terminals of an active op-amp being a **virtual short**.

when the noninverting terminal is grounded (as it is in this circuit) the inverting input terminal being a **virtual ground**.

- Plan some tests to see, in the laboratory, if this circuit indeed is an absolute value circuit. Perform these tests, fully documenting all tests and results.
- Make the input voltage an 8 Vpp sinusoid, at 200 Hz. Carefully measure and record voltages at all nodes in the circuit, using the notation for voltages shown in the schematic.



Use any reasonable value for R. Use silicon diodes (1N4004 or similar), and 741C or LF 351 op-amps.

#### LAB REPORT:

In your lab report be sure to fully and clearly explain the circuit operation with both polarities of input voltage, and document your test plan and its results.